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EXAMINER

KUBELIK, ANNE R

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,410	Applicant(s) WOLF ET AL.	
	Examiner Anne R. Kubelik	Art Unit 1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/18/08 and 12/9/08.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 55-83 is/are pending in the application.
- 4a) Of the above claim(s) 73-81 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 55-72 and 82-83 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/20/08, 10/28/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's election without traverse of group I (claims 55-72 and 82-83) in the reply filed on 18 August 2008 is acknowledged. Claims 73-81 are withdrawn from consideration as being drawn to a non-elected invention.

Claim Objections

2. Claims 63 and 82 are objected to because of the following informalities:

In claim 63, line 2, there is an improper article before "watermelon".

In claim 82, line 5, there is an improper article before "plant".

3. Claims 66-69 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The dependent claims 66-69 are broader than present claim 64; the recitation "further comprising at least one additional trait" makes it clear that the plant of the parent claim does not comprise the additional trait. Thus, the dependent claims are not properly dependent upon the parent claim.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1638

5. Claims 55-72 and 82-83 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to a genus of watermelon plants, wherein the plants have fruit that have elevated fructose or elevated sucrose contents, a reduced total sugar content, superior sweet taste characteristics, and that lack bitterness as compared to unspecified other watermelon plants.

The claimed genus includes two mutually exclusive claimed subgenera. Plants in which the average fructose content is 50% to 60% of the total soluble sugar cannot also be plants in which the average sucrose content is 65% to 75% of the total soluble sugar. Another subgenera is also claimed, plants in which the average fructose + sucrose content is 90% to 95% of the total soluble sugar; this subgenera includes plants that do not fall within either of the first two subgenera.

Thus, it appears that more than one gene is responsible for conferring elevated fructose and sucrose content on watermelon fruit. The specification describes no genes that are responsible for conferring elevated fructose and sucrose content on watermelon fruit. Further, the specification describes no genes that are responsible for a plant being devoid of bitterness or for having superior sweet taste characteristics. Thus, the specification describes no the structure(s) as being required for the recited functions of elevated fructose and sucrose content in watermelon fruit.

Art Unit: 1638

Further, a number of the claimed characteristics are affected by environmental conditions. In watermelon sugar content, including fructose, glucose and sucrose ratios and content, is affected by temperature and shading (Kano, 2004, J. Hort. Sci. & Biotechnol. 79:142-145; Fig 5-6) and irrigation rate (Leskovar et al, 2004, J. Hort. Sci. Biotechnol. 79:75-81; Table V). Total sugar contents, as well as percent sucrose and fructose contents, are affected by the year the plant was grown and storage conditions of the fruit (Chisholm et al, 1986, Hortsci. 21:1031-1033; Table 1), as well as the maturity of the fruit (Elmstrom et al, 1981, Amer. Soc. Hort. Sci. 160:330-333, Table 2).

The specification mentions several watermelon lines that have either high fructose content or high sucrose content. The bitterness and sweet taste characteristics of these lines is not mentioned. The conditions under which they were grown or the fruit stored is not mentioned. None of these lines appears to be available to the public.

One of skill in the art would not recognize that Applicant was in possession of the necessary common attributes or features of the genus of watermelon plants in view of the disclosed species.

Hence, Applicant has not, in fact, described watermelon varieties within the full scope of the claims, and the specification fails to provide an adequate written description of the claimed invention.

Therefore, given the lack of written description in the specification with regard to the structural and functional characteristics of the claimed compositions, Applicant does not appear to have been in possession of the claimed genus at the time this application was filed.

Art Unit: 1638

6. Claims 55-72 and 82-83 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims are drawn to a genus of watermelon plants, wherein the plants have fruit that have elevated fructose or elevated sucrose contents, a reduced total sugar content, superior sweet taste characteristics, and that lack bitterness as compared to unspecified other watermelon plants. The claims are also drawn to a method of making the plants.

The instant specification, however, describes the selection of watermelon lines with fructose or elevated sucrose contents, wherein the parent lines are an unspecified *Citrullus colocynthis* plant and an unspecified proprietary *C. lanatus* plant (pg 13, line 17, to pg 14, line 19) and wherein the parent lines are “the wild species of” *Citrullus* and unspecified commercial varieties (pg 20, lines 8-27).

The instant specification fails to provide guidance for what criteria are used to select plants for the initial breeding steps. Virtually no information is provided as to what properties the parent wild-type *Citrullus* plant and the *C. lanatus* plant should have.

The claims encompass producing F1 progeny of these crossing in which the F1 progeny have fruit in which the average fructose content is up to 60% of the total soluble sugar, the average sucrose content is up to 75% of the total soluble sugar or the total sucrose and fructose content is up to 95% of the total soluble sugar. The specification does not even teach this is possible - the paragraph spanning pg 13-14 indicates that several rounds of backcrossing and/or

Art Unit: 1638

selfing were required to produce fruit with these characteristics - much less teach which wild-type *Citrullus* and *C. lanatus* lines would produce F1 progeny with these characteristics.

Given the claim breath, unpredictability, and lack of guidance as discussed above, undue experimentation would have been required by one skilled in the art to develop and evaluate methods for producing the claimed plants.

Thus, the instant invention is not enabled.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 55-72 and 82-83 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Dependent claims are included in all rejections.

The comparison to currently available varieties, as in claims 55 and 71, is a relative comparison with no indication of the fructose and sucrose content, bitterness or sweet taste characteristics of the fruit of those lines. Which “currently available varieties” are the plants to be compared to?

Claims 56-57 are indefinite in their recitation of “average fructose content”, claims 58 are indefinite in their recitation of “average sucrose content” and claim 59 is indefinite in its recitation of “average ... content of fructose and sucrose”. Under what conditions are these averages determined? Kano (2004, J. Hort. Sci. & Biotechnol. 79:142-145) teaches that in watermelon sugar content, including fructose, glucose and sucrose ratios and content, is affected by temperature and shading (Fig 5-6).

Claim 70 is indefinite because many of the members of the Markush group are not tissue types, but rather are plant parts, and hence do not further define “tissue”.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 55-56, 62-65 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Elmstrom et al (1981, Amer. Soc. Hort. Sci. 160:330-333).

Elmstrom et al teach inbred watermelon lines (Dixielee and Calhoun Gray) in which the average fructose content of the fruit is at least 55% of the total soluble sugar, at least at some days after anthesis (Table 2). The plants would have been grown from seeds. A plant regenerated from a tissue culture of these lines would be identical to these lines.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a), which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 55-65 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elmstrom et al (1981, Amer. Soc. Hort. Sci. 160:330-333).

The claims are drawn to inbred and hybrid watermelon lines in which the average fructose content is up to 60% of the total soluble sugar, the average sucrose content is up to 75% of the total soluble sugar or the total sucrose and fructose content is up to 95% of the total soluble sugar.

Elmstrom et al teaches inbred watermelon lines in which the average fructose content is up to 55% of the total soluble sugar, at least at some days after anthesis (Table 2).

Elmstrom et al do not teach watermelon lines in which the average fructose content is up to 60% of the total soluble sugar or in which the average sucrose content is up to 75% of the total soluble sugar or in which the total sucrose and fructose content is up to 95% of the total soluble sugar.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to breed for watermelon lines with fruit in which the average fructose content is up to 60% of the total soluble sugar, the average sucrose content is up to 75% of the total soluble sugar or the total sucrose and fructose content is up to 95% of the total soluble sugar, using the lines taught by Elmstrom et al as a starting point. One of ordinary skill in the art would have been motivated to do so because Elmstrom et al teach the importance of selecting watermelon lines for high fructose levels to get sweeter fruit (pg 332, right column, ¶2). Further, one of skill in the art would have been motivated to select lines with high sucrose content, as sucrose also confers sweetness to fruit and quality to the fruit (pg 330, right column, ¶1).

13. Claims 66-68 and 82-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elmstrom et al as applied to claims 55-65 and 72 above, and further in view of Robinson et al (1999, J. New Seeds 1:1-47).

Art Unit: 1638

The claims are drawn to inbred and hybrid watermelon lines with fruit in which the average fructose content is up to 60% of the total soluble sugar, the average sucrose content is up to 75% of the total soluble sugar or the total sucrose and fructose content is up to 95% of the total soluble sugar, and such plants into which genes for disease resistance and/or male sterility has been introduced by breeding.

The teachings of Elmstrom et al are discussed above. Elmstrom et al do not teach watermelon lines into which genes for disease resistance or male sterility has been introduced by breeding.

Robinson et al teach the importance of producing hybrid cucurbits, including watermelon (pg 2, 5, 13, 36), genes for disease resistance, including from watermelon (pg 8), genes for male sterility, including from watermelon (pg 32), and production of triploids and tetraploids (pg 33-34).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the method of watermelon plants as taught by Elmstrom et al, to introduce genes for disease resistance or male sterility by breeding as described in Robinson et al. One of ordinary skill in the art would have been motivated to do so because such genes would allow that plants to grow in areas with high disease rates, or to aid in breeding. One of ordinary skill in the art would have been motivated to introduce the trait by single gene conversion because that would allow the fruit to retain all the other desirable characteristics, like sweetness, and lack of bitterness.

Art Unit: 1638

14. Claims 66-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elmstrom et al as applied to claims 55-65 and 72 above, and further in view of Zhong et al (2002, US 2002/0073445).

The claims are drawn to inbred and hybrid watermelon lines in which the average fructose content is up to 60% of the total soluble sugar, the average sucrose content is up to 75% of the total soluble sugar or the total sucrose and fructose content is up to 95% of the total soluble sugar, and such plants into which genes for disease resistance or male sterility has been introduced by transformation.

The teachings of Elmstrom et al are discussed above. Elmstrom et al do not teach transformation of watermelon.

Zhong et al teach transformation of watermelon (¶106, claims 6-7), including with genes that alter sugar content (claims 15-16, 25, 27), as well as tissue culture of shoot regenerable cells of a watermelon plant (¶106).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the watermelon plants as taught by Elmstrom et al, to introduce genes for disease resistance or male sterility by transformation as described in Zhong et al. One of ordinary skill in the art would have been motivated to do so because of the suggestion of Zhong et al to do so (¶57).

Conclusion

15. No claim is allowed.

Art Unit: 1638

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

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February 19, 2009

/Anne R. Kubelik/

Primary Examiner, Art Unit 1638